Chapter 16

Librarians as Midwives of Change in Scholarly Communication

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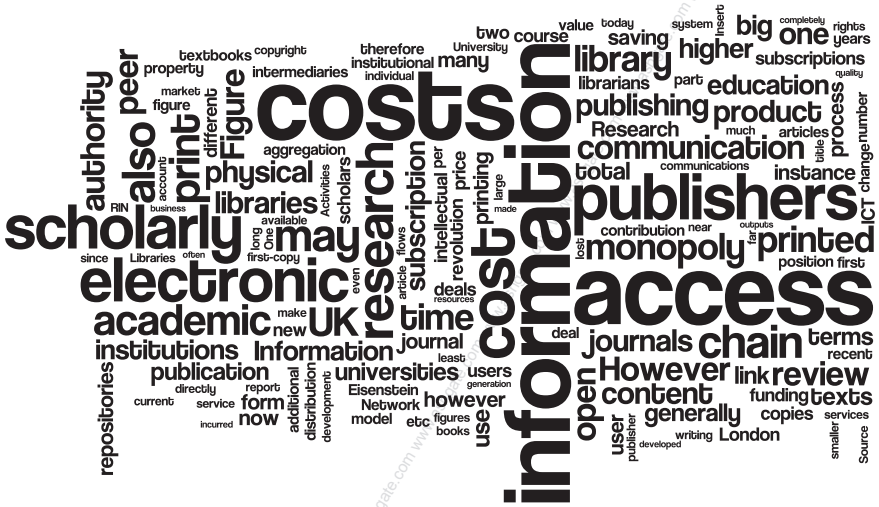

'Force is the midwife of change' – Karl Marx

Introduction

History testifies to two ICT revolutions. In my reckoning scholarly communication is now in the grip of a third. The point of this chapter, to paraphrase Marx, is to show that librarians are in a position not simply to interpret the world of scholarly communication, but to change it, or at least to act as the midwives of that change.

The first ICT revolution was the development of writing. Beforehand the only vehicle for storing information was the human memory. Transmission relied on speech and signs; if content was not to perish with the individual, replication needed time and personal contact. After the invention of writing, portable storage media decreased the restrictions imposed by time and space. Knowledge became much less vulnerable; more could be stored and passed from generation to generation or carried across long distances; critical thinking was enhanced.

While writing represented a huge advance, scholars in the world of manuscripts knew severe limitations. They tended to travel to manuscripts, which were often in

jeopardy: witness the destruction at Alexandria. It was very difficult to determine provenance and authority, and to compare texts. Dissemination by copying tended to corrupt texts.

It is almost impossible for us now to appreciate the scale and impact of the second ICT revolution – printing with movable type – we have spent our lives during its maturity. Scholars in the late 15th and early 16th centuries were however under no illusions about its nature. We hear of Johann Fust having to flee Paris: its inhabitants believed that only someone in league with the devil could produce so many perfect copies of the bible. Later Fust was conflated with Georg (subsequently known as Johann) Faust, who was of course reputed to have sold his soul to the devil in return for knowledge (Eisenstein 1993, p. 19–20). Particularly telling is the association of a technology, so marvellous that it could only be achieved through necromancy, with the pursuit of that most dangerous commodity – knowledge.

For the scholar the advances represented by printing were marked. The possibilities of obtaining texts were hugely enhanced. By 1503 8 million books had been printed, more, it is estimated, than the number of manuscripts produced between 330AD, the founding of Constantinople, and 1453, when it was captured by the Turks; the cost of copying one manuscript equated to the cost of producing over 300 printed books (Eisenstein 1993, p. 13–14). Provenance and authority were enhanced by the use of title pages; texts became more organised and exploitable through indexes, tables of contents etc. Later editions improved texts through corrections; they did not corrupt them as copying had corrupted manuscript texts.

Looking forward 200 years from the birth of printing, Guédon (2001) discusses one of its major outcomes: the invention of scholarly communication by Oldenburg with the *Philosophical Transactions of the Royal Society of London*. He also notes the fluidity at that time of boundaries between the various players in publishing (writers, printers, book dealers). Under Oldenburg's direction the achievement of the *Philosophical Transactions of the Royal Society of London* was twofold. First they acted as a register of intellectual property: publication there was equivalent to establishing title to that property. Secondly acceptance by an editor or peer review panel conferred status and credibility through the backing of the journal's name.

Today's third ICT revolution has been predicted for at least a century. At the end of the 19th century, Octave Uzanne (1894) was writing of the demise of the book:

> I do not believe (and the progress of electricity and modern mechanism forbids me to believe) that Gutenberg's invention can do otherwise than sooner or later fall into desuetude as a means of current interpretation of our mental products… You will surely agree with me that reading, as we practise it today, soon brings on great weariness; for not only does it require of the brain a sustained attention which consumes a large proportion of the cerebral phosphates, but it also forces our bodies into various fatiguing attitudes. If we are reading one of our great

> newspapers it constrains us to acquire a certain dexterity in the art of turning and folding the sheets; if we hold the paper wide open it is not long before the muscles of tension are overtaxed ...

Uzanne did not foresee the move from broadsheet to tabloid newspapers. His substitute for print was more radical: the phonograph, playing wax cylinders. In more recent times microform was hailed as the successor to print.

What we recognise as today's electronic revolution is not new in the scale or nature of its impact. Luther nailed his 95 Theses to the door of Wittenberg's *Schloßkirche* on 31 October 1517. Within two weeks they were translated and known throughout Germany; throughout Europe in a month (Eisenstein 1993, p. 153). For contemporaries this lightning speed was as fantastic as the speed of electronic communication today.

Eisenstein (1993, p. 45) also notes that printing fostered social and intellectual combinatory activity. Much innovative scholarly work was undertaken outside the established academic centres. Printers developed networks of contributors and researchers, to improve their texts and give a competitive edge. Again this strikes a chord today with the development of virtual research communities and the sharing of research data (Borda et al. 2006).

Eisenstein (1993, p. 80) quotes Thomas Jefferson on the preservative powers of print:

> How many of the precious works of antiquity were lost while they existed only in manuscript? Has there ever been one lost since the art of printing has rendered it practicable to multiply and disperse copies? This leads us then to the only means of preserving … that is a multiplication of printed copies.

This points forward to the current LOCKSS initiative – Lots Of Copies Keeps Stuff Safe.[1]

These echoes of very current concerns and issues remind us that there is every reason to believe that the current, third ICT revolution will indeed at last replace print, bringing as far-reaching effects as the first two.

The Information Value Chain

A strong echo of the past is the fluidity of roles in Oldenburg's time, which Guédon compared above to the fluidity evident today. A firm taxonomy of roles will highlight the changes that have taken place since the 1990s, and may help us to predict future possibilities and directions. Bide's useful taxonomy (Ball 2005) identifies the following activities or functions in the information supply chain: creation, publication, aggregation, access and use. To a greater or lesser degree,

1 http://www.lockss.org/lockss/Home.

each of the activities, or links, adds value to the information, until it is used and the value realised.

This account is simplified, concentrating on the key players in the chain. Some of the main concepts applied during this discussion are: branding, authority, monopoly, and the product-to-service shift. Each link in the chain confers an element of branding or authority on the information. Authority has to do with reliability, informed opinion, having status or expertise. One thinks for instance of the BBC: news broadcast in the World Service carries a great deal of authority. Branding has to do with consistency and quality. Coca-Cola and Pepsi Cola are different brands, with different qualities, consistent in themselves and having different adherents. Each link in the chain also has a greater or lesser degree of monopoly. This is obviously particularly important for the information marketplace.

One major factor differentiating electronic from printed information is the shift from product to service. With printed information, much labour and cost are tied up in producing, distributing, storing and handling a physical product: books and journals. With electronic information, libraries and other intermediaries generally provide or facilitate only access to information held elsewhere, a service not a product. It is worth noting that this shift follows a general trend, as companies and public bodies outsource or disaggregate activities.

Creation

The first link in the chain is creation. Creators may be authors or compilers. They may be directly employed by publishers, as are journalists and technical writers. They may be employed as academics, and hence expected to produce articles and monographs as part of their employment. Alternatively they may be independent agents.

In literature or fiction, the creator confers authority. In picking from the shelf one of Anthony Powell's novels, one knows what one is getting. The creator is also a monopolist; this monopoly, recognised and protected by copyright, is then generally transferred to a single publisher.

Publication

The publication link is essentially concerned with the selection and editing of information into consumable and buyable form (titles, series, journals). In one sense it is a form of quality control. Publishers also market the product, and undertake, or subcontract, physical production and distribution or electronic storage.

For librarians, authority is conferred in part at least by the imprint – Oxford University Press, for instance, or Butterworths. The end-user is more likely to focus on the brand – e.g. Who's Who. In scholarly communication, the editorial and refereeing process creates authority, and is concentrated at the level of the title. The publisher's monopoly, often transferred from the creator, is also jealously preserved.

As we all know, the delivery of information in electronic form embodies some important differences from delivery in printed form. There is essentially no physical production and distribution of electronic information. There is a physical realisation at the moment of use – as an image on a computer screen or a print-out. But this occurs only at the end of the information chain, not close to the origin, as happens with print. For the rest of the chain we are talking about access to the information, not a physical product containing the information. Librarians, as purchasers, are therefore now buying, on behalf of our users, a service as opposed to a physical product.

This of course has many and quite far-reaching repercussions. In the days of print, libraries and their users were bound only by the law. For instance, the law of copyright for printed works is complex but generally well understood by librarians in terms of fair dealing for research or private study. However the information provider or intermediary is now able, through licences, to impose restrictions on the use of the electronic form of the information far beyond the limits outlined in copyright legislation. The balance of rights between users and copyright owners enshrined in the legislation has therefore shifted in favour of the publisher.

We should also note that, with electronic information, authority is potentially diluted. It is easy to publish and disseminate information on the web, far easier than publishing and disseminating in print, which require considerable investment of money and time.

Aggregation

One may define aggregation as bringing together in a coherent collection disparate information sources. Libraries have conferred authority by virtue of selecting printed material. Users perceive a certain warranty of fitness for purpose if a book is in their library's collection.

Libraries have had a perhaps unrecognised near monopoly on aggregation of printed information. With electronic information, there is no physical product to acquire or handle. The role of aggregator therefore moves elsewhere in the supply chain, to the publisher or intermediary such as the serials agent.

Libraries' collective near monopoly, evident for printed information, is therefore lost: users need set foot nowhere near a library to have access to aggregators' sites; they simply need a network connection, and either the appropriate permissions or deep pockets.

A relatively new area of aggregation is of course the institutional repository, bringing together the citation, and full text of a university's research output. In many institutions the repository falls within the remit of the librarian, as the custodian of the aggregate of its research output, who, as in the context of print, confers authority by virtue of selection and preservation.

Access

Facilitating and controlling access to aggregated printed information has been core territory for libraries, a perhaps unrecognised near monopoly. Tools have been developed: catalogues, bibliographies and indexes aid discovery and location; library management systems control access to collections.

Providing access to electronic information is however fundamentally different. New tools have been developed, as the focus has switched from controlling physical access to identity management. Libraries have lost the monopoly on access: the majority of our users can connect to information resources as easily from a living room, or a train, or a beach, as through a library. Perhaps paradoxically, the open access movement and the mushrooming of repositories have sidelined the librarian: search engines such as Google Scholar and free access to pre-prints have circumvented the traditional library, allowing the researcher direct unmediated access to texts. The coming generation of search tools may also sound the death knell of the abstracting and indexing services so familiar to our profession.

The hybrid stage that we have experienced since the start of the new millennium – having to maintain a rump of print unavailable in electronic form while the majority of usage is electronic – somewhat obscures this development. It is a distraction – uncomfortable, time-consuming and expensive. Much attention is devoted for instance to the systems architecture that evolved in the print era: it is no longer fit for purpose, but it has not yet been replaced by an architecture for the hybrid or solely electronic library.

Use

Finally we arrive at the end of the chain and its reason for existence, the user, who of course, particularly in the academic sector, may also be the start of the chain.

Hitherto we have stressed that, for traditional printed resources, we have been dealing with a physical product. What we provide to the user in the electronic environment is a service – access to the information – not the physical product itself. However, Ranganathan's Five Laws of Library Science (1931), slightly paraphrased, are just as applicable to electronic resources:

- Resources are for use.
- Every user his or her resource.
- Every resource its user.
- Save the time of the user.
- The library is a growing organism.

There are anomalies of course. Academics have immediate access to a far greater corpus of material, yet licences impose restrictions on non-academic use. The library is a shrinking organism of information held directly and physically, but a vastly expanded and growing organism in terms of access to information.

The Economic Background

This section attempts to identify, in broad terms, the costs associated with the links in the information value chain just discussed. It concentrates on academic journal publishing, utilising Research Information Network's 2008 report. The figures rely on many assumptions, disputed by publishers and others. However, even if they do not give a completely accurate picture, they are extremely valuable in providing an overall indication of the costs of publishing and how they are distributed. As librarians, intermediaries, purchasers, we tend to concentrate on the visible costs, those associated with subscription and access for instance. It is salutary to have one's mind focused on the hidden costs.

Publication

The report's breakdown of the costs of the publishing link of the chain for journals is as in Figure 16.1.

'First-copy costs' are the fixed costs for peer review, editing etc., and amount to 57% of the total costs. Variable costs arise from distribution, printing and subscription management. Indirect costs are overheads for marketing, hosting, investment etc.

Per article first-copy costs are estimated to be £2,330, and total costs to be £4,057. It is worth noting that the first-copy costs arise whatever the method of publication – subscription or open access, or form – print or electronic.

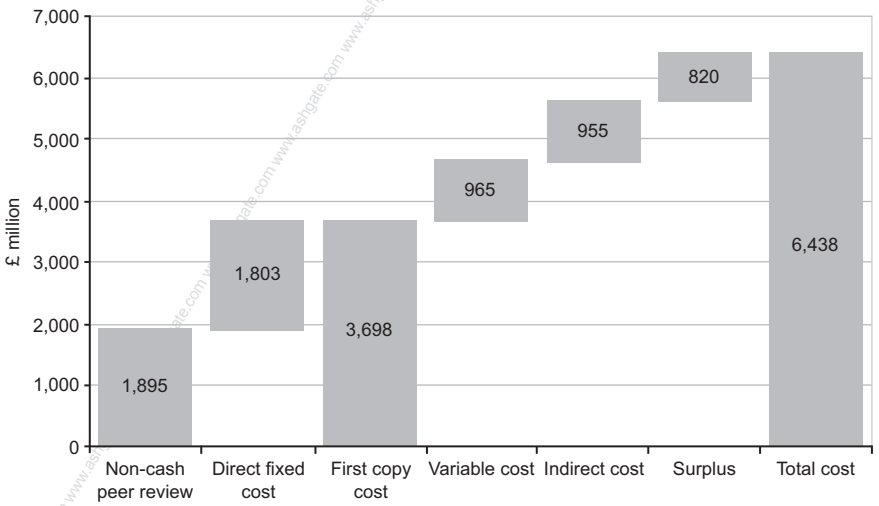

Figure 16.1 Total publishing and distribution cost incurred in the global scholarly communication process by activity

Source: Research Information Network, 2008. Reprinted with permission of RIN.

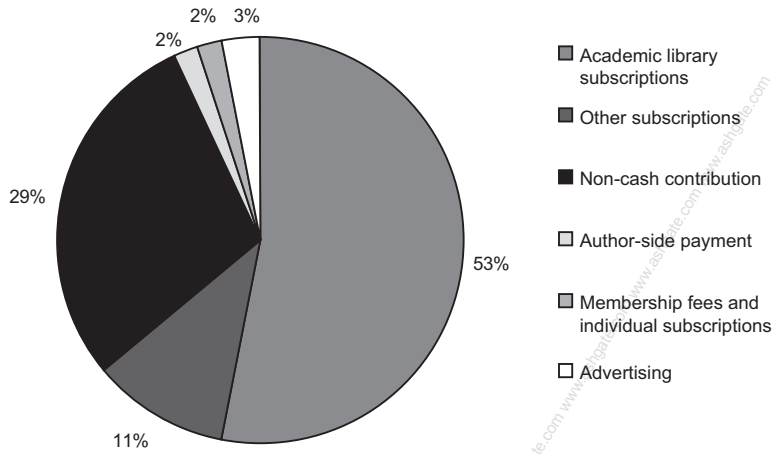

Figure 16.2 Funding contribution to meet global publication and distribution incurred cost (all journal types)

Source: Research Information Network, 2008. Reprinted with permission of RIN.

Figure 16.2, from the same source, illustrates the contributions made to meet these costs. Academic library subscriptions cover 53% of the costs; non-cash contributions (peer review and editing) cover 29% of the costs. Thus 82% of the costs are borne by higher education institutions.

These contributions recognise that higher education institutions benefit from scholarly publication in two ways: first from the peer review process that recognises the quality and impact of their research; second from access to the research of other scholars.

These calculations of course take account only of costs; they ignore the value in intellectual property rights (IPR) donated by scholars to publishers.

The profile for funding scholarly monographs will be somewhat similar: high first-copy costs with a non-cash contribution from the author in terms of the IPR, and the bulk of the revenue from academic libraries. One difference is that authors will generally receive a royalty; however the number of copies sold will generally be small, although print-on-demand may increase the time that the monograph remains in print and hence the number of copies sold.

The economics of textbooks are however very different. The study by Content Complete and OnlyConnect (2009) records the publishers' view that sales to students account for 70–90% of overall revenue from textbooks, with the remainder coming from libraries. Librarians may dispute these figures, but, despite the second hand trade amongst students, there is a large element of 'repeat business', with each new cohort of students buying new copies of the same titles. According to Content Complete (2009), the Publishers Association in the UK estimates undergraduate spending on books in 2006/07 at £220 million. Library

budgets would be hard pressed to match this spending, so publishers' reluctance to make textbooks available as e-books to libraries is quite understandable.

With textbooks a further difference is the high volume of sales, compared with that of the scholarly monograph. The royalties passed to academic authors of textbooks will be correspondingly large in terms of volume.

Access and Use

The Research Information Network report also provides useful data on the access and use links of the chain, at least for the UK.

Figure 16.3 shows that the total cost of access provision, excluding subscriptions at about £117 million, borne by libraries, is £72 million, 12% of the total in this link. The bulk of access costs (£530 million, or 86%) is made up by the time spent by researchers in locating, displaying, downloading and browsing articles. The report excludes here the cost of reading.

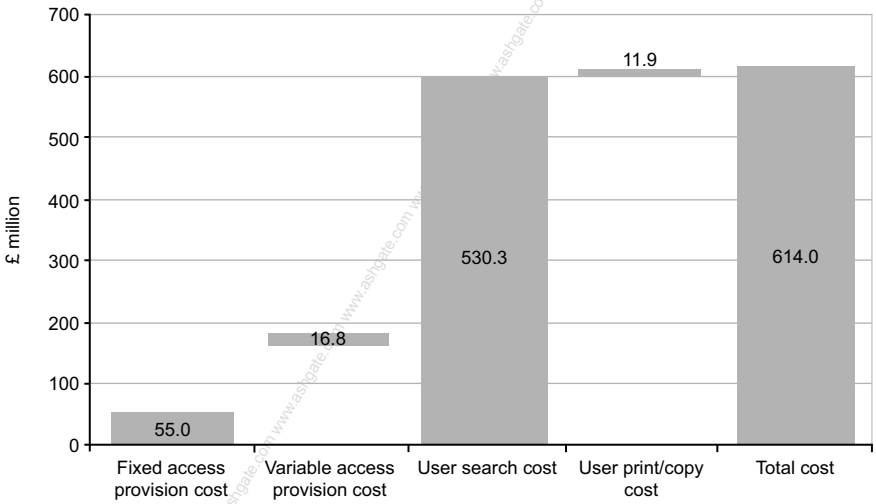

Figure 16. 3 Total annual access provision and usage cost incurred in the UK scholarly communication process

Source: Research Information Network, 2008. Reprinted with permission of RIN.

Figure 16.4 shows the total UK contribution, including peer review and subscriptions, to the total cost of scholarly communication.

These figures may not give a completely accurate picture. However there is a stark message for academic libraries. We have concentrated much intellectual effort on trying to contain subscription increases, in negotiating deals for content. Yet at £117 million, subscriptions account for only 12% of the UK's contribution; even peer review is larger, accounting for nearly 14%.

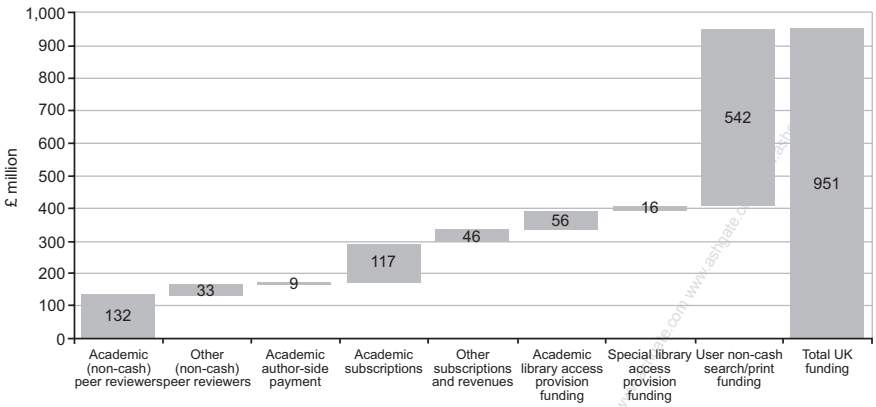

Figure 16.4 UK funding contribution to the total cost of scholarly communication UK

Source: Research Information Network, 2008. Reprinted with permission of RIN.

But the really remarkable figure is the £542 million cost of the final (use) link of the chain in locating and downloading articles – 57% of the total. Remembering Ranganathan, should we not as a profession be paying more attention to saving the time of our users? In purely economic terms, saving 10% of costs here is the equivalent of saving 46% of subscription costs or 41% of the costs of peer review, both completely unachievable.

Trends in Pricing and Negotiation

Despite the figures just quoted, subscription costs remain important: they constitute an actual outflow of cash and they are directly measurable. However, in negotiating we have let ourselves be manoeuvred into a weak position *vis-à-vis* the academic publishers. We are producers for and consumers in a mature, profitable, multi-million pound business. Yet we donate our intellectual property, donate staff time for peer review etc., and then buy the resulting product through subscriptions.

Negotiating with journal publishers is problematic. They are monopoly providers: *Nature* for instance is only available, ultimately, from Nature Publishing Group. There is little competition in the academic market, since generally one cannot substitute one title for another. Publishers will only reduce prices if they see a cost saving or some other benefit. They may offer additional content for the same price, but with any price reduction the saving by the university could go directly to other publishers. As far as the publishers are concerned, reduced prices equal decreased surplus and loss of market share.

In the UK higher education negotiations with publishers for electronic content began in 1995 with the Pilot Site Licence Initiative (PSLI). This set the model for

later 'big deals' negotiated by the Joint Information Systems Committee (JISC) through the National Electronic Site Licence Initiative (NESLi, subsequently NESLi2). NESLi2 offers a licence and a framework agreement negotiated with publishers; individual higher education institutions may then opt in to the agreement. The big deals generally allow access to all of a publisher's content issued in a defined time-span. Pricing has been based on historical print spend. Thus higher education institutions with low historical spends on print journals have benefited disproportionately. There has however been some equalisation of charges over the last years.

Practice in the USA has been different from the opt-in model: a consortium will often make a one-off payment to a publisher to make content accessible to all members. Costs are allocated to individual higher education institutions according to an agreed formula. This model is now being seen in the UK, for instance the Scottish Higher Education Digital Library (SHEDL) makes a single payment; the entire publisher's content becomes available to all Scottish higher education institutions.

Doubts about the long-term effects of the big deal have been expressed for a number of years (Ball 2003). In the short term it offers a huge amount of content for information-hungry scholars. However, it reinforces the monopoly position and advantage of the big publishers: journal prices rise faster than inflation, and library budgets; librarians have understandably felt unable to cancel their big deals; spending has been cut elsewhere, on non-big deal publishers, putting them at risk, or the bookfund. Agreements also run for three or five years, and have strict no-cancellation clauses covering the content; freedom of manoeuvre is very restricted.

Although it may offer some cost benefits, the single-payment big-deal model, such as SHEDL's, seems to reinforce the monopoly even further. If it is difficult for a single academic library to cancel a big deal, how much more difficult will it be to cancel a deal for a whole country's academic libraries? It seems that for the sake of limited cost savings on subscriptions, as we have seen, a relatively inexpensive link in the chain, we are willing to place yet more power in the hands of the publishers.

Following the pain inflicted by exchange-rate fluctuations, there are indications that librarians are for the first time seriously considering cancelling big deals when they come up for renewal. Some publishers (generally the smaller ones) have moderated price increases. However the big ones are refusing to moderate price rises or to allow cancellations. They are also making clear that moving away from the big deals will bring no price advantage. The implication is obvious: they are confident that, in the majority of cases, cuts will fall on their competitors, further strengthening their position in the market.

Finally mention must be made of the part played by the regional purchasing consortia for HE in the UK, such as the Southern Universities Purchasing Consortium (SUPC). They have traditionally negotiated with intermediaries, such as subscription agents, rather than with publishers. Their effect is limited in terms

of scholarly communication: negotiations are restricted to the services offered by intermediaries and, in terms of cost, to the intermediaries' margins, which are on average under 8% of the subscription price.

What Is to Be Done?

It has long been recognised (Ball and Spice 1996) that the electronic age offers the potential to turn academic library practice on its head. University libraries until now have promised to collect or gain access to the research outputs of all other universities and research institutions, a task that is both impossible to accomplish and costly to attempt. With the widespread introduction of institutional repositories, however, it is now feasible for each university or research institution to collect all the research outputs of its own scholars, and make them available to all other universities. This task, by contrast, is finite and achievable; the costs are commensurate with the research standing and income of the academic institution.

Universal access is therefore achievable; recent approaches to universities by publishers, offering themselves as an alternative to the institutional repositories, indicate some nervousness at this prospect.

However, at the moment, apart from a very small number of open access journals and an even smaller volume of author-paid articles in subscription journals, what is lacking outside commercial publishing is peer review. This is the key to higher education's weak position *vis-à-vis* the academic publishers.

There are some measures that might be taken to weaken the power of the publishers and facilitate change:

- Copyright – As has been noted already, the academic world has for too long given away rights to its intellectual property. On the other side of the coin, electronic journals have also enabled publishers to alter the balance of rights to the detriment of the casual, non-affiliated user. For the future we should ensure that academics/higher education institutions grant publishers only a non-exclusive right to publish, and retain their right to publish through repositories (for further discussion see Chapter 8 by Alma Swan).
- Repositories – Critically these allow us to take back the monopoly on aggregation and lay the foundation for open access. We should continue to develop the infrastructure of institutional repositories and foster a culture of academics depositing research outputs as an integral and automatic part of the research and publication process.
- Support open access journals – The first-copy costs identified above (for peer review etc.) do not disappear. However the cost and value of these services are more transparent, and open to competition, if the author or higher education institution bears them (the 'author pays' model). See below for some of the cost implications.

- Create overlay journals – These are virtual journals, the content of which is not collocated but remains distributed across institutional repositories throughout the peer review and publication process.

What can be achieved is demonstrated by the University of California's flagship eScholarship programme, which

> provides a suite of open access, scholarly publishing services and research tools that enable departments, research units, publishing programs, and individual scholars associated with the University of California to have direct control over the creation and dissemination of the full range of their scholarship'.[2]

Here it might be noted that repositories and open access are hospitable to the scholarly monograph, as well as to the journal article or conference paper. They enable us once again to function as university presses.

Recent work by Swan (2010) of Key Perspectives for the JISC has highlighted the cost implications of some of the above measures. She indicates that there are cost savings for many universities in open access models; however universities publishing large numbers of articles may incur additional costs. At a cost of £1,000 per article for an open access journal, the three smaller of four universities surveyed would save between £0.17 million and £1.4 million per annum; the largest, most research-intensive would face additional costs of £1.86 million per annum. At a cost of £1,127 per article in an overlay journal, savings for the two smaller universities ranged from £0.38 million to £1.25 million per annum; the two larger universities would face additional costs of between £0.35 and £2.67 million.

However, as in Research Information Network's 2008 report cited above, Swan also identifies major additional saving in the efficiency of the research process. Here we need to play a full part in the core library business of saving the time of the user.

Conclusion

What is clear from the above discussion is that we are caught up in an ICT revolution as momentous as the birth of printing. New structures are taking shape, breaking the mould that has been familiar to us for 300 years. At the moment we perceive them only dimly, and there are many practical, cultural and financial impediments to their development. However our duty is to embrace, lead and harness change. We have a unique opportunity to act as midwives, delivering a new age of scholarly communication by, to return to the Marxist metaphor, reclaiming the means of production.

2 http://www.escholarship.org/.

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